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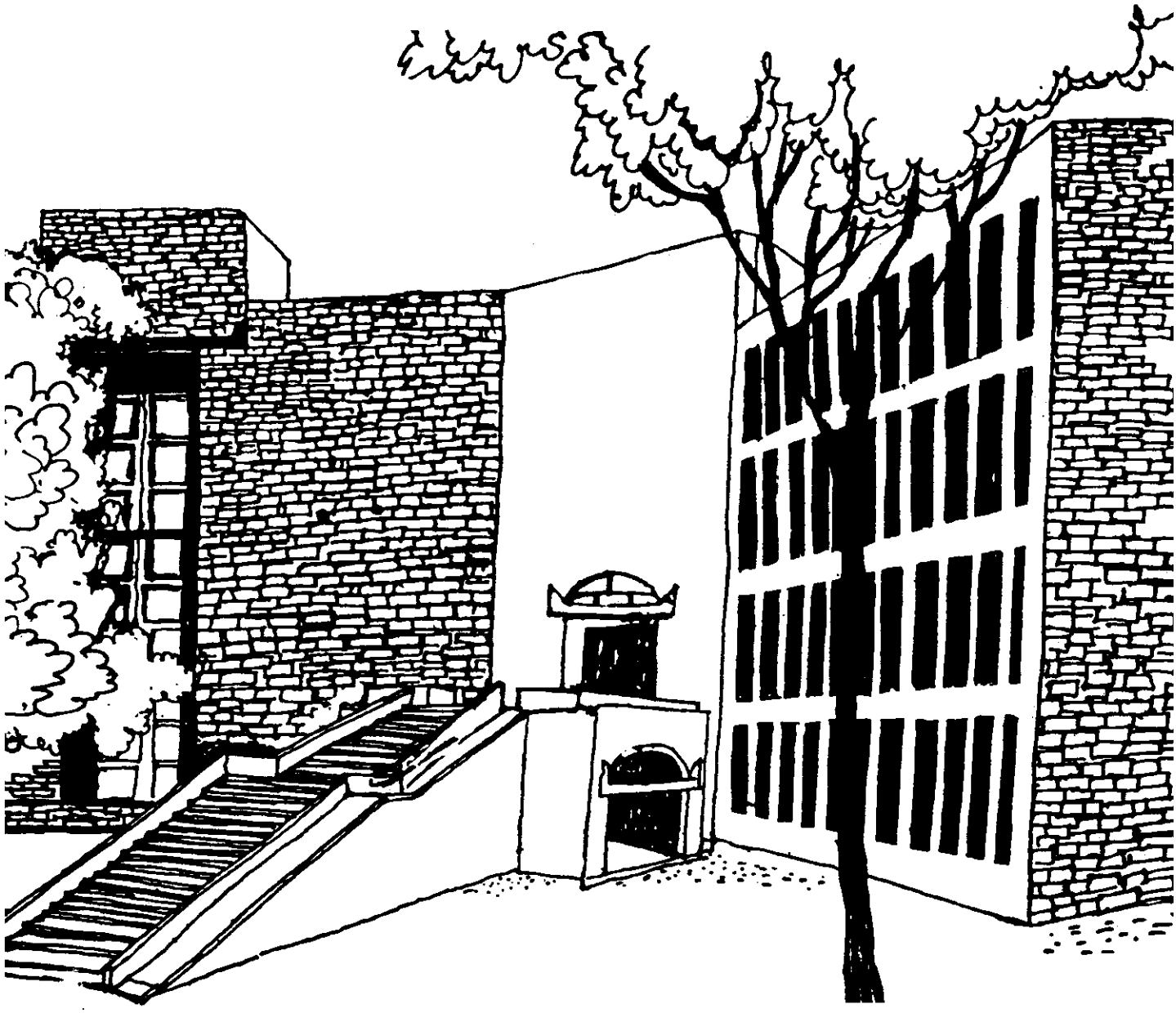

BIODIVERSITY AND POVERTY VIS-A-VIS BIOTECHNOLOGY AND PROSPERITY

By

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Biodiversity and poverty vis-a-vis biotechnology and prosperity

Abstract

The debate on intellectual property rights of third world farmers, pastoralists and artisans has almost always been guided by the fear that the industry in the developing countries(particularly drug industry) would be wiped out if patent rights demanded by the western companies were granted. This position, I contend, stems from inability of the elite scientists and policy planners in these countries to recognise the strength of the indigenous knowledge systems. It is assumed that there is no knowledge reserve in these developing countries which can provide a bargaining strength to these countries.

I argue that this is neither a very sensible position nor very useful one while negotiating on this subject. There is a tremendous richness in the knowledge systems of the developing society much of which is in great demand. Unfortunately we have not realised its importance. The result is our excessive dependence on imported technologies and lack of development of indigenous capacities.

I also share the dilemma of a third world researcher who by documenting such richness of local knowledge tries to make the farmers' wisdom a common property. Whether this tactical effort would make third world planners shift their stand, agree to sign the convention, patent all the land races, file cases for royalty from companies using any of these plants and refuse the concept of biodiversity as a common heritage remains to be seen.

DNA finger printing as a biotechnological tool can be a means of establishing the relationship between patented land races and any new plant variety. The paper also argues that biodiversity is rich in the regions of high environmental risks such as drought, floods, hailstorm etc. Without protecting the knowledge resources of the people in these regions, extraction of their knowledge poses serious ethical and professional dilemma.

Biodiversity and poverty vis-a-vis biotechnology and prosperity

Why is it that in regions which get developed through infusion of modern technology, institutions and market the biodiversity invariable declines? Putting it conversely, why should local communities in developing tropical world remain poor so as to maintain genetic diversity that becomes then available for biotechnologists and other scientists to make use of.

Out of 119 plant derived drugs, 70% are reported to be used precisely for the purpose for which native people discovered and used these plants[1]. The multinational drug companies reaped rewards by making the extraction of active ingredients from these plants efficient. The conceptual relation between malady and remedy had already been established by the people.

In 70 per cent of these cases, people have done the first level of research. The second level of research making the extraction efficient or discovering an equally effective biochemical analog of the organic substance was an important contribution. But, was it the most important contribution? If we have to trace the evolution of modern capitalism and prosperity which followed from industrial revolution could we say that contribution of scientists who discovered some of the early simple technologies of making steel, lifting water, vulcanizing rubber , etc., were less important, why should then in the same spirit of intellectual rigor and professional collegiality should we not acknowledge the contribution of farmer innovators.

Is the question of sharing part of this profit reaped by the MNCs with the farmers and tribal innovators a legitimate one? After all if the MNCs had not done the R & D would many of the vaccines and drugs developed become available to masses at all? Was it not true that indigenous medicine system was highly location, time, doctor or healer specific? If the native people knew the remedy,

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1. Norman R.Farnsworth, **Screning Plants for New Medicines**, in Biodivesity, Ed.E.O.Wilson, National Academy Press, Washington, D.C. 1988, 84-97.

why did they not market it globally and make money ? Who advised them to evolve a code of ethics in which knowledge was considered a common property?

These questions confront each one of us who is directly or indirectly engaged in the task of making people's knowledge a common property? The last resource or weapon of knowledge left with the disadvantaged people of the tropical world is being destroyed through a technological disarmament . And worse is the tragedy that people like me are part of this disarmament process.

Selection 832 of tomato costed about 22$ when it was picked up from Peruvian city of Cuzcu in 1962. Fourteen years later this was found to be a new specie named in the honour of a Polished tomato geneticist and an associate of Prof.Rick. Dr.Iltis who collected this sample was very proud that while each of the collection costed US government on the average of only 22$ (1962 value) it fetched about 18 million dollar during the decade of 80's because it helped in increasing the soluble *solid* content from 4.52-6.2 percent to 7- 7.52 percent(Dr.Iltis, 1986)[2]. No where a case is made that people of Cuzco had any claim on this profit which by now would have swelled to 160 to 200 million dollars.

Dr Iltis concludes in his research article that biodiversity be maintained for future generations and US government should increase its investments in such collections. But, whose future generations and where would benefit from this? Nobody knows whether this line of tomato collected from Cuzcu in Peru ever contributed anything to the wellbeing of that community. I wonder if the company which marketed the tomato variety containing genes from selection 832 and the industry which made tomato ketchup ever even thought of sharing any part of the income with Cuzcu community. Iltis termed this process as serendipitous because the use was discovered accidentally with great effort and after long time. However, if one recollects reference above to the fact that in

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2. U.H.Iltis. **Serendipity in the exploration of biodiversity: what good are Woody tomatoes** in BIODIVERSITY, Editor E.O.Wilson, National Academy Press, Washington, 1986; 98 - 105.

70 % cases of the modern plant derived medicines people knew the right use, perhaps the cost of research could have been lesser and discovery could have been linked more systematically with indigenous knowledge systems.

I do not know whether patenting this property is the right answer. In a recent newsletter on farmers' innovations -Honeybee- I have provided out of 94 innovative practices, 34 examples of plant protection practices. Many of these might extend the frontiers of science as my initial enquiry with entomologists and pathologists has revealed. I have given the name and addresses of these farmers as well as name of the communicator through whom I learnt this practice. Some months ago a senior executive of Rallis India wrote to me requesting for a copy of an annotated bibliography of peasant innovations including plant protection practices.

I faced the dilemma then and I face the dilemma now. Being a professor, responsible for producing knowledge for universal applications should I refuse to share these practices with a large company whether multinational or national. Can I really do it if I wanted ? Assuming that some of the receivers of this information do discover some low toxicity herbal pesticide which has commercial implications, would these companies have any responsibility to share any part of profit with the farmer or community discovering the use?

Assume that this pesticide make commercial cultivation of a crop more profitable in a region where other resources such as good soil and irrigation are plentiful and market forces are strong. Also assume that this practice was discovered from a dry village where demand for modern input is very low and need for low external input technologies is very high. With an increase in supply from a new region the price of the particular commodity may either come down cutting into the profits of the dryland producer or the buyers of this commodity/crop find it more profitable to procure it from an alternative region where large stretches of this crop are cultivated - thanks to the pesticide discovered with the help of an innovation produced originally in a dryland village.

If the farmers whose practices I have shared in this newsletter become worse off because of my academic pursuit of the subject and my urge to make his/their innovation known to everybody, how would I forgive myself. Mind you, this is not to say that we are dealing with only innovations frozen in time. These innovations will keep taking place.

One of the question then is whether India should sign the Intellectual Property Convention, patent all the land races of grass, shrubs, trees, weeds, etc. and file cases under WIPO or International Court of Justice to claim royalty from any company whichever uses any of these plants for any purpose in future[3]. It is likely that the western nations and their companies will shift their ground, agree to negotiate the patent rights and perhaps reduce the life of the patent to only few years, say 5-7. Their profits might reduce from billions to millions and ensuing competition might give a chance to a smaller biotechnology companies to network with third world institutions. Profits foregone might be a more realistic gain through negotiations rather than asking for monetary transfer for every use. But I have no definite views on this subject. I am willing to learn about more imaginative ways of compensation. I have discussed some of these separately (Gupta, 1991).

It is also possible that nothing of this sort happens and somebody makes a neat profit and invites me to a conference to justify that biodiversity should be a common heritage. I may even be asked to chair a session or give a keynote address. If a company is very generous, it may pay for my wife

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3. India has the technology for DNA fingerprinting, thanks to Dr. Lalji Singh at CCMB, Hyderabad. It can be used to establish I presume the linkage between a variety and the germplasm patented by India. In order to have South-South cooperation, India will have to develop protocol for exchange of expertise and knowledge with other developing countries.

   It has been argued that pharmaceutical industry in India would suffer if India signed the IPR convention. I would not regret that. In any cases how much of heir profits these companies spend on indigenous R &D? Further, loss of allopathic system of medicine might as well be the gain of Ayurvedic and Unani system. Some of the life saving drugs can be kept out of this patenting system. Such drugs would only be few. In any case when Indian Government could not implement the recommendations of the Hathi Committee and ban production of large number of useless formulations of doubtful clinical utility, to expect same government to implement even stiffer laws may be meaningless. Whether health interests of masses are well served through a distorted health care policies any way is a separate subject which Panos has dealt with in a recent issue.

What would happen to the level of living of the farmer who shared his innovations in good faith with me.

Harshanbhai of Village Mallupur in District Banaskantha, Gujarat tried to control the infestation of termite by putting some of the green (less than 30 - 40 days) cut plants of sorghum in the irrigation channel. Perhaps, the hydrocyanide content in young sorghum stocks had a toxic effect on termite. To my knowledge this relationship perhaps has never been explored before. I do not know how effective this method is. But if there are some sorghum lines which have high toxicity due to high HCN content and these are used for this purpose. Either farmer would demand less of the pesticide or a company may extract the toxic chemical at a very low cost and increase its effectiveness by combining it with some other chemicals for use in even for other crops or other pests. Will Harshanbhai get any share in the profits of the company?

Likewise, Dudhaji from village Nava in District Bunaskantha used the leaves of Calotropis with the same method to minimize aphid infestation in mustard. There are large number of other such practices. Biotechnology makes it possible not only to transfer some of the desirable genes having such properties from wild , cultivated or weed plants to the desirable crops, but biotechnology also makes it possible to synthesizes analog of the active compounds. In that case the company would not need the plant. However, the information coded in the compound and discovered by the local farmers would have been utilized and made redundant.

In the regions where ecological heterogeneity is high such as dry regions, forest regions, hill areas, some of the flood prone areas, the biodiversity is also high. Market forces are weak because con-

centrated demand over space and time for market inputs is low. Therefore, the biotechnology companies and foolish optimists like me unwittingly join hands, reduce the cost of collecting this information through research like mine often supported by public money and thereby bring disaster or create conditions for such a possible disaster for the innovators and producers of this knowledge. Ethno-botanists have been used by the drug companies for ages.

I am convinced that the shameless surrender of our elite to the IMF and World Bank in the recent past is only first step. Very soon, we would sign all other agreements which we may have been hedging for so long. While I do not deny the need for structural reforms and reduction in budget deficit, I do not think a developing country should only think of growth through import of technologies by inviting multinational corporations. It is a pity that a country like ours which is so rich in biodiversity and the knowledge system evolved by people around this biodiversity even while remaining poor, is oblivious of our potential prosperity.

In the current economic environment it is very difficult to wage this struggle for protecting intellectual property rights of third world farm men and women, artisans and pastoralists without global networking on these issues. The very title of our newsletter we have started-Honeybee- draws inspiration from two dimensions of Honeybee's behaviour:

Honey bee collects pollen from the flowers without making flowers poorer and it connects flower to flower through pollination and increases biodiversity. We have to reflect on our own behaviour and ask ourselves what do we do when we collect knowledge of people and incorporate it in global knowledge systems.

I have still very high hopes that world opinion will change. And that some multinational companies and farmer lobbies in the Europe which are forcing their governments to impose unfair conditions on

the third world would reflect on their conduct.

The sustainability is not possible to be achieved in true sense of the term at local level. The smoke of bombs in Iraq and burning oil wells in Kuwait diffuses all around. Any other damage would have equally serious consequences for the entire humanity particularly if damage is through genetic erosion.

Let us not pray that local communities in high risk environments should remain poor so that they will maintain high biodiversity[4]. But we must also remember that market forces have no interest in their prosperity. However, networks like Panos and Honeybee can make a difference by generating a dialogue and persuading the elite to take risk and open new paths of solidarity for sustainable development. If even one Managing Director of a large multinational biotechnology company or agrichemical company agrees to invest in this process through an open and accountable mechanism, the effort would be justified. Alternatively, if the governments in developing countries like India, Bhutan, Nepal or any other tropical Asian, African, Latin American country can put a price on entire biodiversity and patent the germplasm the dialogue will then have to be conducted anyway.

I believe that voluntary codes evolved through negotiations, honest compromises and accountable institutions have a better chance than empty rhetoric or non-sustainable coercion. But optimal coercion, as some one said , is not zero[5].

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4. A more detailed account of this process is provided in two recent working papers, Anil K Gupta (1991), Why does Poverty Persist in Regions of High Biodiversity?: A case for Indigenous Property Right System , Indian Institute of Management Working Paper no 938, Ahmedabad; and Anil K Gupta (1990), The Right To Resource: Peasant Knowledge, Protocol of It's extraction and Ethics of Collaboration in Extraction, IIM Working Paper no 851, Ahmedabad.

5. Ref: Paquet, Deptt. of Public Administration, Univ of Ottawa, Canada